

The generic allocation of some little-known Paradoxosomatidae from South-East Asia (Diplopoda, Polydesmida)

by

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With 19 figures

ABSTRACT

The generic position of certain paradoxosomatid species from various countries in South-East Asia described by J. Carl and R. V. Chamberlin is discussed. *Desmoxytes* Chamberlin, 1923, is a senior synonym of *Pratinus* Attems, 1937 (tribe Hylomini); the new genus *Pteroxytes* is proposed for *Pratinus terae* Jeekel, 1964, from the Malay Peninsula (tribe Hylomini). *Polylobosoma* nov. gen. is proposed for *Orthomorpha roseipes* Pocock, 1895, from China (tribe Sulciferini). *Chinosoma* Chamberlin, 1923, is a junior synonym of *Helicorthomorpha* Attems, 1914 (tribe Tectorporini). The new genus *Orophosoma* is erected for *Orthomorpha hingstoni* Carl, 1935, from Tibet (tribe Polydrepanini). The contents and the relationships of the treated genera is discussed.

INTRODUCTION

In my classificatory outline of the family Paradoxosomatidae (JEEKEL 1968), the position of several species and genera could not be properly established due to the fact that certain data of basic importance, especially with regard to the structure of the male gonopods, were not yet known. The re-examination of type-material, preserved in the Muséum d'Histoire Naturelle of Geneva and in the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, resulted in the elucidation of the status of a number of these genera and species. Pertinent diagnoses, illustrations and remarks are given hereunder.

SYSTEMATIC PART

TRIBE HYLOMINI Cook & Loomis, 1924, stat. and char. emend. Jeekel, 1968

This tribe was admitted in the 1968 classificatory outline of the Paradoxosomatidae to emphasize the somewhat isolated position of the genera *Hylomus* Cook & Loomis, 1924, and *Pratinus* Attems, 1937. It should be emphasized, however, that the definitions of the tribe itself and of the two contained genera was, and still is, far from satisfactory. The Hylomini is particularly characterized by the strong development of the paranota, which in some cases take the shape of antlers, combined with the condensed configuration of the apex of the gonopods. Within the scope of this brief characterization there is, however, a wide scale of variation which includes transitions to other tribes, in particular to the Orthomorphini, and perhaps also to the Sulciferini. In fact, very little new evidence is needed for the suppression of the Hylomini and the transfer of its members to the Orthomorphini.

On the other hand, however, the species referred to *Pratinus* in 1964 show considerable differences in their characters, and it will be necessary to recognize some additional generic categories. In this respect I will for the time being confine myself to an evaluation of the status of those species with which I am familiar, and to a tentative analysis of the remaining species.

Desmoxytes Chamberlin

Desmoxytes Chamberlin, 1923: 165.

Prionopeltis Pocock, 1895b: 828. (Preoccupied name; NEW SYNONYMY).

Pratinus Attems, 1937: 113. (NEW SYNONYMY).

Ceylonesmus Chamberlin, 1941: 33. (NEW SYNONYMY).

JEKEL (1968: 51) referred *Desmoxytes* to the category of genera incertae sedis with the comment: "This genus was described as a member of the family Chelodesmidae, and this may be the reason why it was not included in Attems's monograph. There is, however, no doubt whatsoever that it belongs to the Paradoxosomatidae. Unfortunately, that is just about all that can be said on the identity of *Desmoxytes*."

The re-examination of the type material of the type-species, *Desmoxytes coniger* Chamberlin, has shown that the name *Desmoxytes* covers the same taxonomic concept as *Pratinus* and henceforth should replace that name.

Desmoxytes planata (Pocock)

Prionopeltis planatus Pocock, 1895b: 829. (1)

Desmoxytes coniger Chamberlin, 1923: 165. (2) (NEW SYNONYMY).

Euphyodesmus greeni Attems, 1936: 213. (3) (NEW SYNONYMY).

Euphyodesmus (*Ceylonesmus*) *vector* Chamberlin, 1941: 33. (4) (NEW SYNONYMY).

Distribution. — Andamans: Great Cocos Island (1); Ceylon: Peradeniya (3); Honolulu, Hawaii: in soil about plants from Ceylon (4); in soil about plants from Java (2).

Remarks. — The above synonymy concerns the formal confirmation of the identity of *planatus*, *greeni* and *vector* suggested in an earlier paper (JEEKEl 1964: 62, 63), and the addition to the list of *coniger*. Of the latter species the type material in the Cambridge Museum has been examined, and the following notes and drawings were made.

Collum with some hairs on weakly developed granules along the anterior margin and in the middle of the surface, and a transverse row of four large, hairless tubercles along the posterior border. Tergite and paranotum of 10th somite as illustrated in Figure 1. Sternite of 5th somite of male with a large knob between the anterior coxae, which is longer than wide, and widest just caudad of its middle. Its anterior side is concave in front, its apex is rounded and produced a little cephalad. The femora of the 5th and 6th pairs of legs of the male are distinctly incrassate, but lack a ventral tubercle. Gonopods (Fig. 2-3) practically identical with the gonopods of *greeni* as illustrated by Attems.

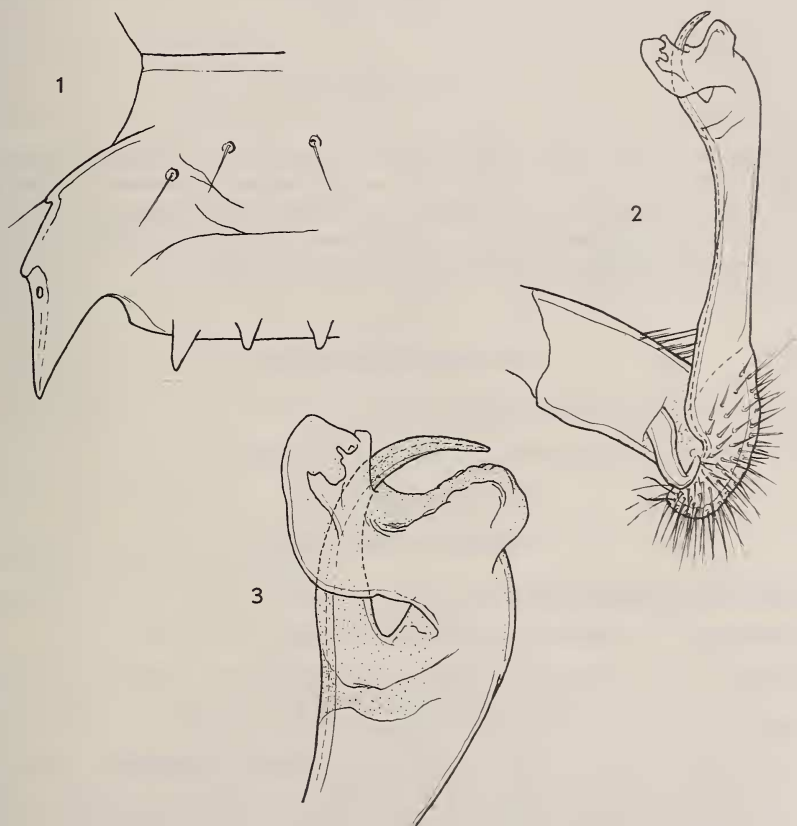


FIG. 1-3.

Desmoxytes planata (Pocock), ♂ holotype of *Desmoxytes coniger* Chamberlin.
 1: left side of 10th somite, dorsal aspect. — 2: left gonopod, medial aspect.
 3: apex of same, same aspect.

Some drawings of the gonopods of *vector*, which were kindly submitted to me by Dr. R. L. Hoffman, show that there are minor differences, which concern the caudal bulge of the tibiotarsus, which is less pronounced in *vector*, and details of the configuration of the apex of the tibiotarsus. No taxonomic significance can be attributed to these slight modifications, which are clearly of intraspecific nature, and there can be no doubt that *coniger*, *greeni* and *vector* are one and the same species.

Although the type material of *planatus* has not been re-examined, sufficient evidence is available to support the proposed synonymy. There is nothing in the description by Pocock which contradicts the identity of his species with *coniger*, *greeni* or *vector*. It may seem strange that Pocock did not mention the incrassate femora of the 5th and 6th pairs of legs in the male of *planatus*, particularly because he did not overlook a similar structure in *Prionopeltis cervinus*. But then we must realize that neither Attems nor Chamberlin noticed this particular feature in their material.

The simple drawing of the gonopod given by Pocock matches the condition found in *coniger*, *greeni* and *vector*. The statement, however, that his drawing gives the inner view of the gonopod is contrary to the description and must be erroneous. Apparently the gonopod was actually drawn from a lateral view.

The synonymy established here gives *Desmoxystes planata* a very wide distribution and indicates that this species is easily transported by commerce. The fact that it was first discovered on the Andaman Islands does not necessarily mean that it originates from that archipelago. On the contrary, in view of the composition of the known fauna of these islands, one may assume that it was introduced there. Neither can we be sure that either Ceylon or Java is the homeland of the species. On account of the known distribution of the species of *Desmoxystes* most closely related to *planata* it seems more likely that the latter originally belongs to the fauna of Burma or Malaya, and that it was subsequently introduced into its presently known localities.

Desmoxystes cervina (Pocock)

Prionopeltis cervinus Pocock, 1895b: 831.

Distribution. — Tenasserim: Malewoon; S. Tenasserim.

Desmoxystes delfae (Jeekel)

Pratinus delfae Jeekel, 1964: 66.

Distribution. — Thailand: Bukit Besar; Bukit Besar, Nawncasila.

Remarks. — As pointed out earlier (JEEKEL 1964: 66), *Desmoxystes planata* is closely related to *Desmoxystes cervina* (Pocock) and *Desmoxystes delfae* (Jeekel). This relationship is evident from the similarity in the gonopods of the three species, and is now substantiated by establishment of the presence of incrassate femora in the 5th and 6th pairs of the legs of the males. Obviously, *D. planata* is somewhat different from the other two species by having a bulge on the caudal side of the gonopod tibiotarsus and by the presence of a series of four cones along the caudal margin of the tergites.

***Desmoxytes taurina* (Pocock)**

Prionopeltis taurinus Pocock, 1895b: 830.

Distribution. — Burma: Rangoon; Pegu (Taikkyii and Palon).

Remarks. — As regards the status of this species no new information has become available, and more specifically we are still ignorant of the presence or absence of incassate femora in the male. There is, however, no reason for excluding this species from the present concept of *Desmoxytes* on account of the description by Pocock.

In the Malayan Peninsula the Hylomini are represented by a single known species, which was described under the name of *Pratinus terae* Jeekel, 1964. In connection with the description it was pointed out already that this species, although clearly falling within the concept of *Pratinus* as adopted at the time, in certain characters approached *Orthomorpha*. In view of the comparatively isolated position of this species it seems better now to formalize its status by the creation of a new genus.

***Pteroxytes* nov. gen.**

Generic diagnosis. — A genus of the tribe Hylomini, in which the paranota are wing-shaped and as broad at their base as the length of the corresponding metatergite. Sternite of 5th somite of the male with a process between the anterior legs. The legs of anterior somites in the male without femoral modifications. Gonopods with a straight telopodite, the tibiotarsus and solenomerite very short. The separation between the femoral and postfemoral sections of the femorite weakly indicated. Tibiotarsus small, arising distad of the base of the solenomerite.

Type-species. — *Pratinus terae* Jeekel, 1964.

The type-species is the only known species of the genus:

***Pteroxytes terae* (Jeekel)**

Pratinus terae Jeekel, 1964: 69.

Distribution. — Malaya: Perlis, Kaki Bukit, near Kampong Wang Tangga.

***Hylomus* Cook & Loomis**

Hylomus Cook & Loomis, 1924a: 105.

The in situ drawing of the gonopods of the type-species of this genus as presented by the authors is not adequate for the purpose of comparison. The status of the genus, therefore, could not be satisfactorily evaluated. Through the courtesy of Dr. R. L. Hoffman I have received some drawings which elucidate some of the questionable points, and give the opportunity to elucidate the proper distinctions between *Hylomus* and the other genera of the Hylomini.

Hylomus draco Cook & Loomis

Hylomus draco Cook & Loomis, 1924a: 106; Cook & Loomis, 1924b: 50.

Distribution. — Central China, Kiang-si province, Lu Shan district, Kuling, south of Kiukiang.

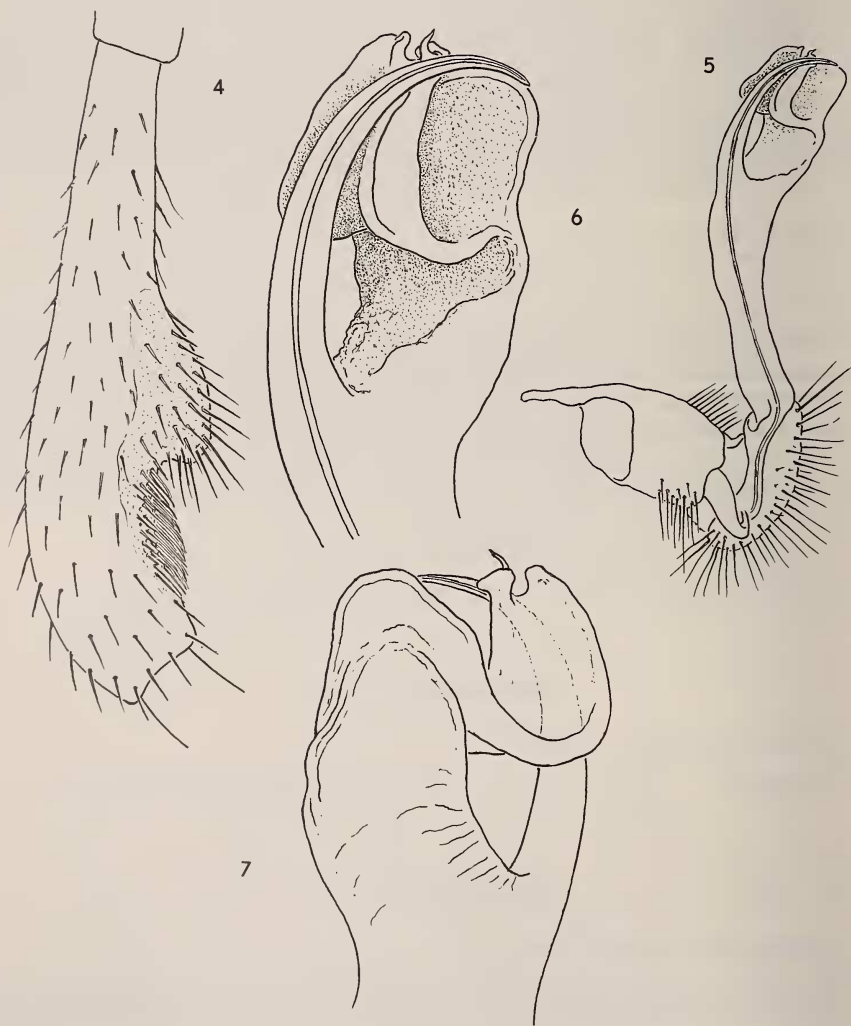


FIG. 4-7.

Hylomus draco Cook & Loomis, ♂ paratype. — 4: femur of 2nd leg of 6th somite.

5: left gonopod, medial aspect. — 6: apex of same, same aspect.

7: idem, lateral aspect. (del. R. L. Hoffman).

Remarks. — The amazing, antler-shaped structure of the paranota has been adequately illustrated by the authors in both cited papers. Similar structures have been described only for "*Centrodesmus*" *cervarius* Attems, 1953, from Tonkin, and for "*Centrodesmus*" *longispinus* Loksa, 1960, from southern China, but it remains to be seen if this similarity really indicates a close relationship between these two and *draco*.

Modifications of the femora of the legs in the male of *draco* are present on the 5th, 6th and 7th pairs (Fig. 4). The same kind of large thumb-like projections have been described for *cervarius*, where they occur on the 6th, 7th and 8th pairs, and for *longispinus*, which has them only on the 7th pair.

The gonopods of *H. draco* (Fig. 5-7) are characterized in particular by the protrusion of the postfemoral section of the femorite distad of the base of the solenomerite, which reminds somewhat of a similar structure in *Desmoxytes planata*. As a consequence the tibiotarsus is U-shaped with its base situated at the same level as its apex. In this respect the gonopods of *cervarius* and *longispinus* appear to have an entirely different structure, the demarcation between the postfemoral section of the femorite and the tibiotarsus being situated at about the same level as the base of the solenomerite. Moreover, there are important differences in the structure of the gonopods of these two species. It seems therefore, that there is no correlation between gonopod structure, shape of the paranota and femoral modifications in the legs of the males.

If we give prevalence to the gonopods we must assume that *H. draco* stands rather isolated from the other known representatives of the Hylomini in the Chinese-Indochinese area.

"*Centrodesmus*" *cervarius* Attems has gonopods in which the tibiotarsus and the solenomerite are comparatively large and elongate, and tend towards structures seen in the Orthomorphini. Similar gonopods have been illustrated by Attems for "*Centrodesmus*" *spectabilis* Attems, 1937, from Annam, and this species seems actually most closely related to *cervarius*, in spite of the fact that it has more wing-like paranota and a simply incrassate femur in the 7th pair of legs of the male only.

"*Centrodesmus*" *longispinus* Loksa according to its gonopods appears to be related most closely to "*Centrodesmus*" *pilosus* Attems, 1937, and "*Centrodesmus*" *asper* Attems, 1937, both from Annam. If we may believe Attems's descriptions these two species lack femoral modifications of the legs, in contradistinction to *longispinus*. In the paranota *pilosus* and *asper* are less specialized than *longispinus*, especially *asper*, although they do not seem to present differences of basic importance. The gonopods of the three species show the condensed configuration of the tibiotarsus and solenomerite suggesting the conditions in *Desmoxytes* and *Pteroxytes*.

In conclusion I come to the following tentative classification of the above mentioned species, using for them the generic name *Hylomus* until more pertinent information becomes available.

GROUP A. — *Hylomus draco* Cook & Loomis (see above).

GROUP B. — *Hylomus cervarius* (Attems)

Centrodesmus cervarius Attems, 1953: 175.

Distribution. — Indochina, Tonkin, Fan-Si-Pan, Chapa.

Hylomus spectabilis (Attems)

Centrodesmus spectabilis Attems, 1937: 124; ATTEMS 1938: 238.

Distribution. — Indochina, Annam, Bana.

GROUP C. — Hylomus longispinus (Loksa)

Centrodesmus longispinus Loksa, 1960: 135.

Distribution. — South China, Central Kuloui, Pien-Ja.

Hylomus pilosus (Attems)

Centrodesmus pilosus Attems, 1937: 124; ATTEMS 1938: 238.

Distribution. — Indochina, Annam, Col des Nuages, Phanrang.

Hylomus asper (Attems)

Centrodesmus asper Attems, 1937: 125; ATTEMS 1938: 240.

Distribution. — Indochina, Annam, Bana, Col des Nuages.

From the available evidence it seems not unlikely that each of the three groups deserves separate generic status. Groups A and B appear to stand rather isolated from each other and from *Desmoxytes* and *Pteroxytes*, whereas group C seems to be more closely related to *Desmoxytes* than to groups A and B.

Of course, the present outline is a preliminary one, and the discovery of new species in the Hylomini may considerably change the picture. It is therefore considered inopportune to formalize it by the proposal of new generic names.

It is interesting to note in passing that if the given outline proves to be correct the excessively specialized shape of the paranota of *H. draco*, *H. cervarius* and *H. longispinus* must have been reached along different phylogenetic lines.

TRIBE SULCIFERINI Attems, 1898, char. emend. Jeekel, 1968

In 1968 the following genera were referred to this tribe: *Akribosoma* Carl, 1935, *Annamina* Attems, 1937, *Anoplodesmus* Pocok, 1895, *Chamberlinius* Wang, 1956, *Chapanella* Attems, 1953, *Chondromorpha* Silvestri, 1897, *Hedinomorpha* Verhoeff, 1933, *Kronopolites* Attems, 1914, *Mandarinopus* Verhoeff, 1933, *Oxidus* Cook, 1911, *Paranedyopus* Carl, 1932, *Sichotanus* Attems, 1914, *Sigipinius* Hoffman, 1961, and *Tylopus* Jeekel, 1968, as well as some Palearctic and Aethiopian genera. Also referable to the tribe are a number of tentatively recognized but as yet unnamed generic categories. In Asia the representatives of the Sulciferini are almost entirely confined to the Asian mainland, from Eastern Siberia down to the Malay Peninsula, and westward to the Indian peninsula and the Himalayas. The range includes the fringing archipelagos of Japan and the Ryukyu islands, but Sulciferini are not found on Borneo or the Philippines.

Of the Asian genera enumerated above the genus *Chamberlinius* Wang has to be removed since HOFFMAN (1973: 377) has shown that it is actually related to *Riukiupeltis* Verhoeff, 1939, and that the tribe Chamberliniini Wang, 1957, should be revived for the accomodation of these two genera. On the other hand *Orthomorphella* Hoffman, 1963, should be removed from the synonymy of *Chamberlinius* and retake the status of a separate genus in the Sulciferini.

The examination of material of "*Orthomorpha*" *roseipes* Pocock, 1895, a species which together with "*Orthomorpha*" *penicillata* Attems, 1931, was regarded in 1968 to constitute an "unnamed genus" within the Sulciferini, not only gives an opportunity to define this genus more properly and to formalize its status by the proposal of a name, but it also elucidated the taxonomic position of "*Sundanina*" *emarginata* Jeekel, 1953, previously set apart as an "unnamed genus" among the genera incertae sedis.

Polylobosoma nov. gen.

Generic diagnosis. — Sulciferini of large to rather small size, in which the caudal border of the lateral sides of a number of somites of the middle part of the body is emarginate, resulting in caudo-ventral pleural lobes. Sternite of 5th somite of male with a process between the anterior pair of legs. Gonopods with the coxa and prefemur moderately developed. Femorite rather long, straight, with the spermal channel running along the medial side. Postfemoral section of femorite not demarcated. Apical part of gonopod consisting of a short lateral lobe or spine and an elongate solenophore which arises more medially and curves caudad and then laterad. Lamina lateralis well developed, lamina medialis present only near the distal end of the solenophore. Solenomerite slender and finely acuminate, hardly sheathed by the solenophore.

Type-species. — *Orthomorpha roseipes* Pocock, 1895.

Remarks. — This genus consists of the type-species, which has "*Orthomorpha*" *penicillata* Attems as a synonym, and which occurs in southern China, and "*Sundanina*" *emarginata* Jeekel, from Tonkin, Indochina. Although the relationship of these two is indubitable, the allocation of the genus within the tribe Sulciferini does not seem to be fully warranted. In most of the more typical genera of this tribe (e.g. *Anoplodesmus*, *Kronopolites*) the gonopods have the solenophore curving in a caudal and more or less mesal direction, whereas in *Polylobosoma* it typically curves caudad and finally laterad. In this respect *Polylobosoma* agrees with genera such as *Tylopus* Jeekel, from Indochina and Burma, *Sigipinius* Hoffman, from southern China, *Sichotanus* Attems, from eastern Siberia, and several unnamed generic categories mentioned in 1968. Of the latter must be mentioned: the unnamed genus for "*Orthomorpha*" *fimbriata* Attems, 1944, and "*Orthomorpha*" *nordenskiöldi* (Attems, 1909), from Japan, the unnamed genus for "*Kronopolites*" *kanoi* Takakuwa, 1943, from Japan, and the unnamed genus for "*Sundanina*" *sigma* Attems, 1953, from Tonkin, Indochina. The classificatory significance of the lateral curve of the solenophorous part of the tibiotarsus of the gonopods is not yet fully understood, and future comparative studies of the gonopods of the genera and species involved will have to determine the systematic value of this particular feature. At present it is only possible to indicate that the occurrence of this character conforms with a particular geographical area: East Asia from Japan and eastern Siberia to Indochina and Burma.

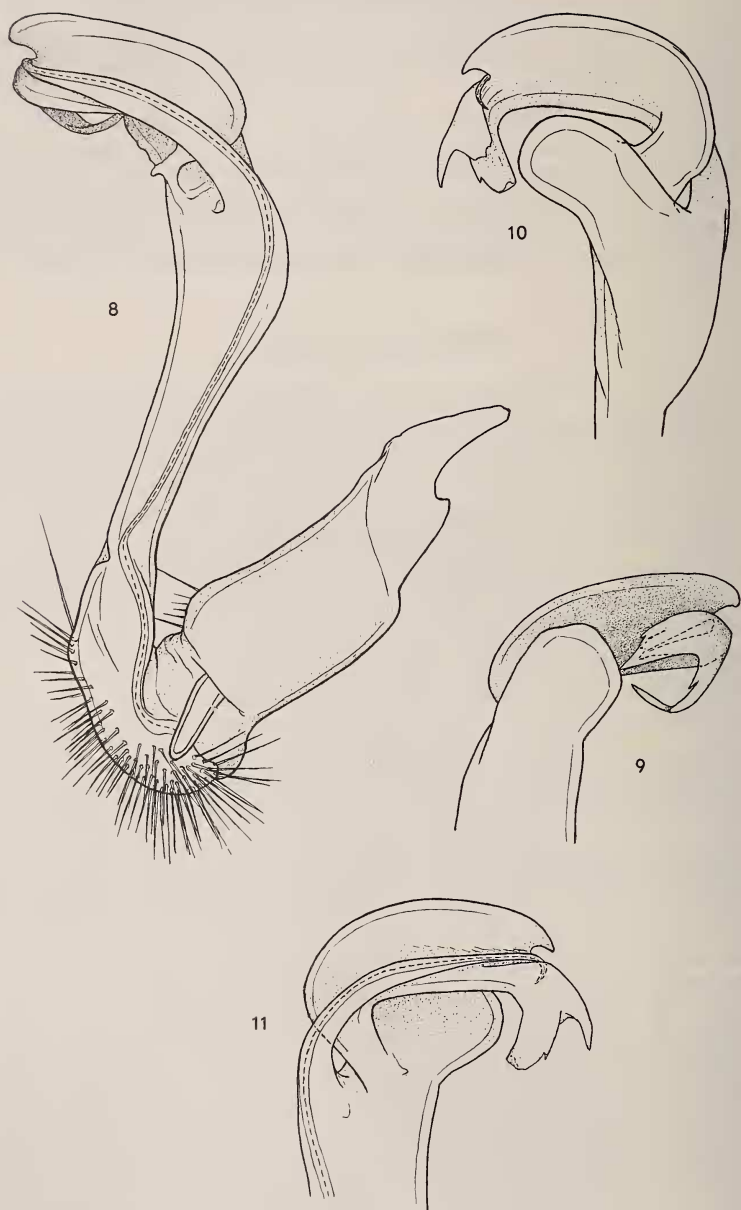


FIG. 8-11.

Polylobosoma roseipes (Pocock), ♂ from Ning-Po (China), 1911. — 8: right gonopod, medial aspect. — 9: apex of same, lateral aspect. — 10: apex of left gonopod, anterior aspect. 11: the same, posterior aspect.

***Polylobosoma roseipes* (Pocock)**

Orthomorpha roseipes Pocock, 1895a: 353. (1).

Orthomorpha penicillata Attems, 1931: 118. (2) (NEW SYNONYMY).

Distribution. — China: Chusan Id. (1); Fukien Prov. (2).

Material. — The Geneva museum has two vials with material of this species under the name of *Orthomorpha roseipes* Pocock. One of the vials contains a ♂ in a very bad state of preservation with the well preserved gonopods in a separate tube. It is labelled Ning-Po (China), 1911. The other vial, labelled Ning-Po, has a ♂, a ♀, and a fragment of a ♀ also in a very bad condition.

Remarks. — The width of the male specimens is 4.6 and 5.1 mm, that of the females 5.6 and 6.1 mm. Owing to the condition of the material no description of the body was possible. It can be said only that the shape of the paranota is exactly similar to that as described for *emarginatum* and the emargination of the lateral sides is also present. As only the male in *P. emarginatum* is known, it must be emphasized that the lateral emarginations are also present in the females of *roseipes* although they are less deep than in the males.

The gonopods are shown in Figures 8-11.

The material at hand came from a locality on the China mainland opposite the island Chusan from where Pocock's specimen came, and may be regarded as nearly topotypical. In spite of this the drawings of the gonopods which Pocock gave show considerable differences with those presented here. For the time being I assume that the drawings which Pocock produced are rough sketches in which the details are proportionally not accurate (drawings for other species, e.g. *Strongylosoma holstii*, in the same paper are also manifestly incorrect).

Attems described his species after material from a locality situated roughly 150 miles south of the locality from which the presently examined material came. His drawings of the gonopods differ only in details from those presented here, and there can be no doubt that both concern the same species, the differences being at most of a subspecific nature.

In his description Attems referred to the pleural lobes as pleural keels. It must be emphasized, however, that these lobes are structures which are quite different from the normal pleural keels as they occur in the Paradoxosomatidae.

***Polylobosoma emarginatum* (Jeekel)**

Sundanina emarginata Jeekel, 1953: 5.

Distribution. — Indochina, Tonkin, Manson Mts.

Remarks. — This species was described in the genus *Sundanina* Attems, 1914, in the at the time prevailing broad concept of that genus, but was later (JEKEL 1968: 64) tentatively set apart under the heading "unnamed genus" in the group of genera incertae sedis.

The species is much smaller than the preceding and differs considerably in the details of the gonopods. Yet the basic structure of the latter, combined with the similarity in the structure of the somites, show that there is a distinct relationship between *P. emarginatum* and *P. roseipes*. In the gonopods the large rounded process arising from

the latero-caudal side of the end of the gonopod femorite in *roseipes* is clearly the homologue of the spine-like process in *emarginatum*. The tibiotarsus in *emarginatum* has a weakly developed lamina medialis and is curved laterad just as in *roseipes*, but it lacks the rather complex apical configuration of the tibiotarsus in the latter species.

As was pointed out in connection with the description of *emarginatum*, the remarkable emarginations of the sides of the metasomites are also found in the species which Carl recorded from Burma under the name of *Sundanina spinipleura* Carl, 1941. Besides that there is an important difference in the actual shape of caudal margin of the metasomal sides, the ventro-lateral lobes bearing in this case a spine-like production instead of being simply rounded, the gonopods of *spinipleura* are widely different from those of *Polylobosoma* and a close relationship of *Polylobosoma* and *S. spinipleura* certainly does not exist.

TRIBE TECTORINI Jeekel, 1968

To this tribe have been referred the genera *Tectorporus* Carl, 1902, *Paternostrana* Jeekel, 1963, *Helicorthomorpha* Attems, 1914, and, with some doubt, *Leiozonius* Jeekel, 1963, and *Euphyodesmus* Attems, 1931. Although the characterization of the tribe, i.e. the position of the solenomerite with regard to the tibiotarsus of the gonopods, seems well founded, the interrelationships of the genera involved are not evident in all cases. There seems to be little room for doubt that *Tectorporus* and *Paternostrana* are closely related, but the status of *Helicorthomorpha* within the tribe is still rather uncertain. The latter genus may also have some affinity to the genera united in the tribe Nedyopodini Jeekel, 1968, possibly via the genus *Vaulogerodesmus* Brölemann, 1916.

Within the genus *Helicorthomorpha* there exists a great deal of confusion as was shown by the list of specific names proposed for taxa clearly belonging to the genus (Jeekel, 1967: 371). As most of these taxa were put in the wrong genus by their respective authors, a comparison of the descriptions is difficult. It is clear, however, that many more species were described than were actually involved. That the 1967 list was not exhaustive is shown by the synonymy established hereunder.

Helicorthomorpha Attems

Helicorthomorpha Attems, 1914: 197.

Helicorhabdosoma Brölemann, 1916: 595.

Chinosoma Chamberlin, 1923: 166. (NEW SYNONYMY).

Kochliopus Verhoeff, 1933: 12.

In 1968 *Chinosoma* was still listed among the *genera incertae sedis* (JEEKEL 1968: 78). A re-examination of its type-species resulted in the above synonymy.

The list of species names given in 1967 is augmented with *Chinosoma hodites* Chamberlin. As no attempt was made to establish the possible synonyms, it may be useful to recapitulate the entire list and to try to eliminate some of the most obvious superfluous "species". In chronological sequence the names are:

Strongylosoma holstii Pocock, 1895

Eustrongylosoma orthogona Silvestri, 1898

Strongylosoma moniliforme Carl, 1912

Strongylosoma philippina Chamberlin, 1921

Chinosoma hodites Chamberlin, 1923

Orthomorpha viatoria Chamberlin, 1924
Kochliopus trivittatus Verhoeff, 1933
Kochliopus trilobatus Verhoeff, 1936
Helicorthomorpha holstii ssp. *uncinata* Attems, 1937
Orthomorpha hodites Chamberlin, 1941
Oxidus (Varyomorpha) kosingai Wang, 1958

***Helicorthomorpha holstii* (Pocock)**

Strongylosoma Holstii Pocock, 1895a: 355. (1)
Helicorthomorpha holstii; ATTEMs 1914: 197.
Helicorhabdosoma holsti; BRÖLEMANN 1916: 596. (2)

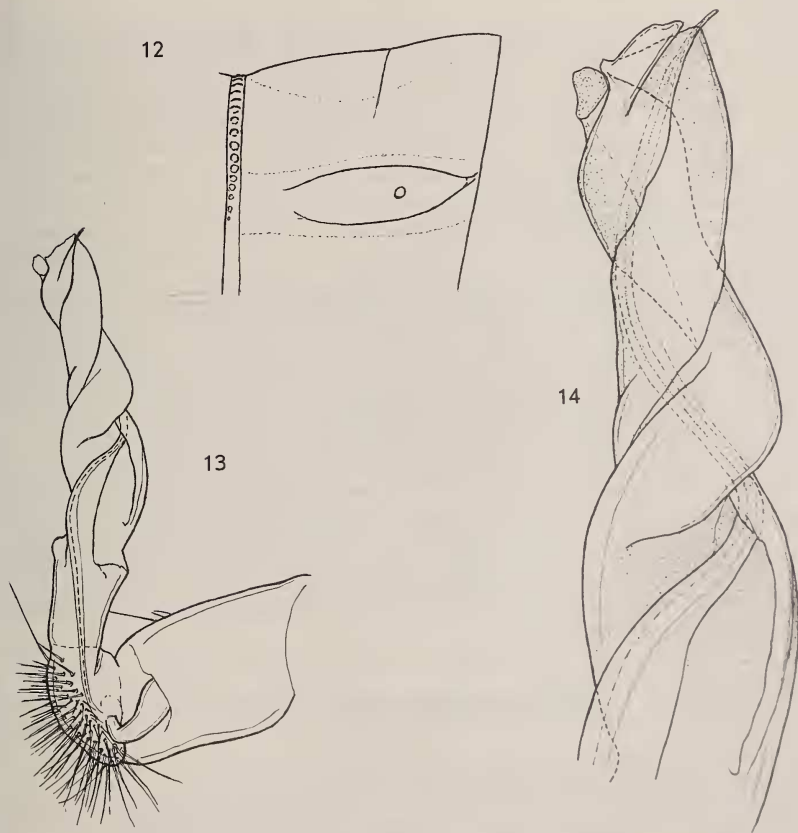


FIG. 12-14.

Helicorthomorpha holstii (Pocock), ♂ holotype of *Chinosoma hodites* Chamberlin.
 12: left side of 9th metasomite, lateral aspect. — 13: right gonopod, medial aspect.
 14: apex of same, same aspect.

- Chinosoma hodites* Chamberlin, 1923: 166. (3)
Kochliopus trivittatus Verhoeff, 1933: 20. (4)
Kochliopus trilobatus Verhoeff, 1936: 310. (5)
Helicorthomorpha holstii; ATTEMS 1938: 215. (6)

Distribution. — Ryu-Kyu Is., Okinawa (= Great Loo Choo) (1, 5); China (3); China, N. E. Szechwan (4); Indochina, Tonkin, Hanoi (2); Indochina, Tonkin, Kouang Tcheu Wan, Ha-Giang, Annam, Cauda, Nhatrang, Phanrang, Bangoi, Nin Hoa, Gia, Dong Trang (6).

Remarks. — In spite of the wide dispersal of the localities from which material has been described and recorded, there seems to be hardly any argument in the available descriptions to support the recognition of so many species.

Besides in the structure of the gonopods, which in all cases seem to have an undivided tibiotarsus, *holstii*, *hodites*, *trivittatus* and *trilobatus* seem to agree in size and colour. Apparently *holstii* has a characteristic and constant colour pattern consisting of a sharply demarcated yellowish middorsal stripe, which is constricted in the waist area and at the caudal margin of the tergites, and a similar stripe on each side at the level of the paranota.

Pocock described *H. holstii* from Great Loo Choo and there seems little reason for doubt that this species was redescribed by Verhoeff under the name of *Kochliopus trilobatus* from the same island, in spite of the obviously inaccurate gonopod drawing given by Pocock. *H. holstii* has been redescribed by Brölemann after material from Indochina, and a comparison of the description and drawings by Brölemann and those given by Verhoeff for *trilobatus* does not reveal any significant difference, in spite of the great distance between the localities.

From the Chinese mainland two species have been described, *Chinosoma hodites* and *Kochliopus trivittatus*. The first of these has been re-examined and drawings of the 9th somite and of the gonopod, based on the type material in the Cambridge Museum are herewith given (Fig. 12-14). Although slight differences in the gonopods may be observed, these do not seem to have any taxonomic significance and rather may have been caused by slight changes in the position of the gonopod or by differences in pressure by the cover-glass of the microscope preparations. Even so, if there are any structural differences at all, these will prove to be of a subspecific nature at the most.

The geographical range of *holstii* in the present concept is rather wide for a paradoxosomatid, even though it seems that the representatives of this family in the temperate regions appear to have a larger distributional area than most species in the tropics have. It seems not unlikely that *holstii* is a species with synanthrope tendencies and may have attained its presently known distribution at least partly by passive transport. The record for *Chinosoma hodites*, captured at Honolulu in soil about cactus plant in baggage from China, supports this conjecture.

Helicorthomorpha ocellata (Pocock)

- Strongylosoma ocellatum* Pocock, 1895b: 801. (1)
Helicorthomorpha holstii uncinata Attems, 1937: 145. (2)

Distribution. — China, Yunnan, Fukien (2); Burma, Rangoon, Tharrawady, Taikkyii (1).

Remarks. — In 1968 *Strongylosoma ocellatum* was tentatively removed from *Helicorthomorpha* and set apart under the heading of "unnamed genus" in the category

genera incertae sedis. A re-evaluation of the available data and a comparison of the description and drawing with *H. holstii uncinata* as described by Attems has resulted in the proposal of the above synonymy.

Unlike the typical *holstii*, *uncinata* has a deeply subdivided gonopod tibiotarsus, and it is clear therefore that *uncinata* cannot be regarded as a subspecies of *holstii*.

The drawing of the gonopod of *Strongylosoma ocellatum* given by Pocock also indicates the presence of a deeply subdivided tibiotarsus, and this was in fact one of the main reasons why I separated this species from *Helicorthomorpha*. If we compare this drawing with the one given by Attems, and make allowances for the difference in position from which the drawings were made and for the usual inaccuracies in Pocock's drawings in the cited paper, it seems highly probable that *ocellatum* and *uncinata* refer to the same species.

H. ocellata apparently has almost the same colour pattern as *H. holstii*, but seems to be a little larger.

Helicorthomorpha orthogona (Silvestri)

Eustrongylosoma orthogona Silvestri, 1898: 442. (1)

Strongylosoma philippina Chamberlin, 1921: 79. (2)

Orthomorpha viatoria Chamberlin, 1924: 173. (3)

Orthomorpha hodites Chamberlin, 1941: 33. (4)

Oxidus (Varyomorpha) kosingai Wang, 1958: 343. (5)

Distribution (type-material only). — Taiwan, Kao-Yung (5); Philippine Islands, Mt. Makiling, Mindanao, Butuan (2), Washington, D.C., U.S.A., in shipment of orchid plants from Manila (3), Honolulu, on root of orchid from the Philippine Is. (4); New Guinea, Ramoi (1).

Remarks. — Although the material after which this species and its synonyms were described came from widely scattered localities, there does not seem sufficient reason for regarding them as separate taxa.

H. orthogona has been recorded from several localities in New Guinea by Attems and a survey of these records and a redescription of the species was given earlier (Jeekel, 1967: 372). Although the gonopods could not be examined, the drawing given by Silvestri seems sufficiently detailed for comparison with those given by subsequent authors in their respective descriptions.

Contrary to *H. holstii*, *H. orthogona* and the "species" which have been regarded as synonymous with the latter, do not have a sharply defined colour pattern. Although the type material of *orthogona* has dark tergites and slightly paler paranota, pale reddish or yellowish middorsal spots may occur, and the paranota also may be yellowish. The pale colour, however, is never sharply demarcated from the dark ground colour.

The colour variation has been explicitly described by Chamberlin for *Strongylosoma philippina*. Although Chamberlin did not produce a drawing of the gonopod of this form, there is little in his verbal description which would justify keeping it separate from *orthogona*.

A similar remark applies to *Orthomorpha viatoria*, which also came from the Philippines. In this case Chamberlin gave a drawing of the gonopod, and although this represents the gonopod from an aspect different from the illustration by Silvestri, there seem to be only differences in detail of the gonopod apex.

The description by Chamberlin of *Orthomorpha hodites* (not *Chinosoma hodites* !) seems a bit mysterious. Although the drawing of the gonopod gives us scarcely any

reason for doubt that he described in fact *H. orthogona*, he writes on the paranota that these are small but distinct and end caudally in "the usual projecting angle". The given width of the type specimen is 2.3 mm as against a length of 20 mm. Both statements are not in accordance with the conditions in *orthogona*, so possibly Chamberlin had a really different species before him. On the other hand it might be possible that his description was mixed up with details of *Orthomorpha coarctata*. Anyway it is difficult to believe that this Philippine material represented a separate species.

Oxidus kosingai from Taiwan also appears to refer to *H. orthogona*. At least colour and size are the same, and the drawing of the gonopod by Wang, giving a rather distorted picture of the organ, does not present sizable differences with other published drawings.

H. orthogona differs from *H. holstii* in the shape of the paranota, which are decidedly shorter in *orthogona*, in the colouration and apparently also in the gonopods. In *H. orthogona* these have a rather deep apical bifurcation, whereas in *H. holstii* the tibiotarsus is undivided. Differences in the drawings of the gonopods for *orthogona* and its synonyms seem to concern minor details partly caused by differences in the position of the gonopods, partly of infraspecific nature.

Like *H. holstii*, *H. orthogona* has a remarkable large distribution which must have been caused largely by passive transport. The finding of material among transported plants indicates that it is easily distributed by human agency. The species seems an alien element in the New Guinea fauna, and its homeland might be the Philippine islands.

***Helicorthomorpha orthogona moniliformis* (Carl)**

Strongylosoma moniliforme Carl, 1912: 136.

Distribution. — Celebes, Duri, Sadaonta, Makassar, Kema.

Remarks. — Carl described this form from a number of widely separated localities in Celebes. His description matches the description of *orthogona* and its synonyms very well, and I would have little difficulty in synonymizing *moniliformis* with *orthogona* if it were not for the fact that the size of the form from Celebes is evidently considerably larger than the average given for the type form. For the time being it seems justified to regard *moniliformis* as a subspecies of *orthogona*.

SUBFAMILY ALOGOLYKINAE Hoffman, 1963, stat. and char. emend. Jeekel, 1968

This subfamily was erected for a number of Oriental paradoxosomatid genera not referable to either the subfamily Paradoxosomatinae or the subfamily Australiosomatinae. It was tentatively divided into two tribes, the Alogolykini and the Polydrepanini, characterized respectively by a reduced and a well developed gonopod femorite.

Evidence which has accumulated subsequently has convinced me that the subfamily is a distinct taxonomic group, even though at present it is not possible to give a more solid definition of its characters and to indicate exactly the genera which it contains. Also the definition of the two tribes is still rather weak and it may be necessary to make emendations in the future.

Without entering into details it must be pointed out here, that the genus *Singhal-orthomorpha* Attems, 1914, from Ceylon, does not belong to the subfamily Paradoxosomatinae, tribe Eviulisomatini, to which it was preliminarily referred earlier

(JEEKEl 1968: 80). Examination of pertinent material has shown, that in this genus the first pair of legs of the males is provided with a femoral tubercle. This, together with the structure of the gonopods, shows that *Singhalorthomorpha* should be re-allocated in the tribe Alogolykini, a conclusion with important zoogeographical implications. A further discussion of this matter is deferred.

TRIBE POLYDREPANINI Jeekel, 1968

This tribe was set up to accomodate the genera of the subfamily Alogolykinae in which the gonopods have a well developed and elongate femorite. The group consists of the genera *Polydrepanum* Carl, 1932, *Xiphidiogonus* Carl, 1932, *Telodrepanum* Carl, 1932, *Delarthrum* Attems, 1936, *Dasypharkis* Attems, 1936, and *Gyrodrepanum* Carl, 1932, all of which have been described from peninsular India and West Pakistan, and the genus *Pocockina* Jeekel, 1965, from Burma. As was remarked in 1968 (JEEKEl 1968: 65) several, partly still unnamed, generic categories occurring in North India may also prove to belong to the same tribe. Material of one of these categories has been examined and this has lead to the creation of the new genus treated below.

Orophosoma nov. gen.

Generic diagnosis. — Rather small-sized Polydrepanini with weakly developed paranota and abortive pleural keels. Sternite of 5th somite of male with a process between the anterior legs, first pair of legs of male with a femoral tubercle. Gonopods particularly characterized by the presence of a fingerlike process on the lateral side of the prefemur. Femorite without demarcation of postfemoral region, bearing at the end two triangular processes. Tibiotarsus irregularly sheathing the solenomerite. The solenomerite with a spine near the apex.

Type-species. — *Orthomorpha hingstoni* Carl, 1935.

Remarks. — In the 1968 classification the type-species and the closely related *Orthomorpha simulans* Carl, 1935, were listed as "unnamed genus" among the *incertae sedis* (JEEKEl 1968: 65). The examination of the gonopods of both species has shown that the assumption that this generic category might be referable to the subfamily Alogolykinae was correct.

Within the tribe Polydrepanini *Orophosoma* stands rather isolated at present, but on account of the taxonomic and geographical evidence it becomes more and more probable that its closest relatives should be sought among those generic categories with which it was more or less accidentally associated in 1968, viz. *Trogodesmus* Pocock, 1895, the unnamed genus for "*Kronopolites*" *unicolor* Attems, 1936, and the unnamed genus for "*Kronopolites*" *spiniger* Attems, 1936. These groups occur all in the same geographical region as *Orophosoma*: the Himalayas and Northern Burma, but unfortunately the available information on the morphological characters of the male in these groups is as yet insufficient to make more definite statements regarding their relation to *Orophosoma*. An important point of agreement is found in the rod-like shape of the solenomerite of the gonopods, and it would be interesting to know whether in *Trogodesmus*, etc., the femora of the first pair of legs of the male are provided with a glandular tubercle.

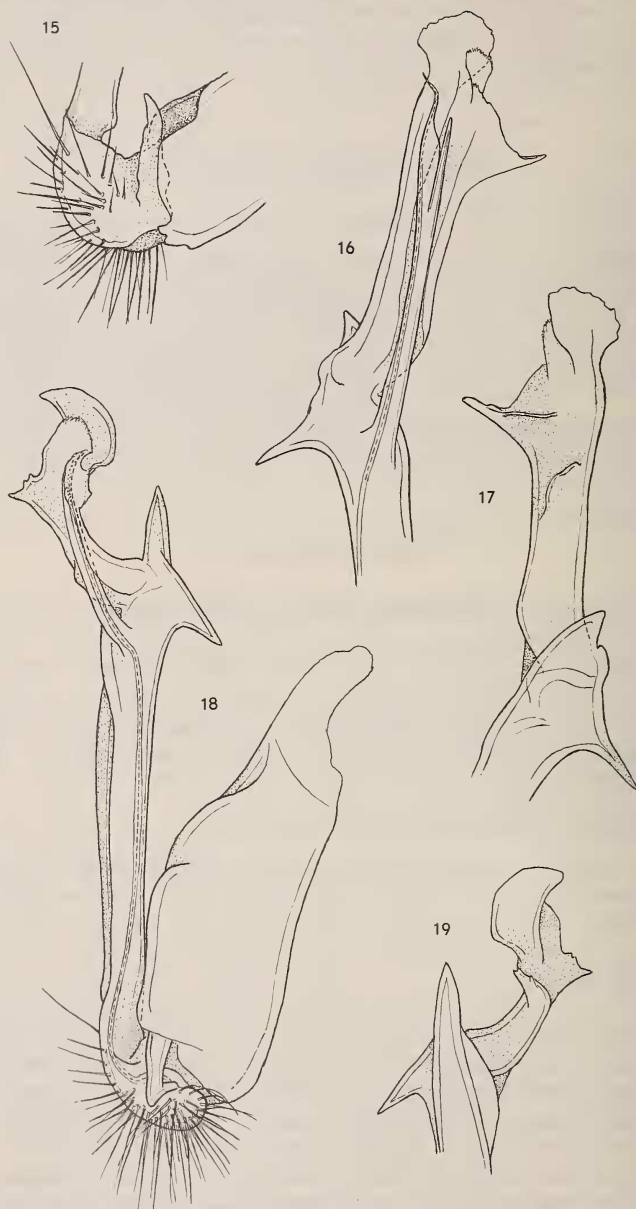


FIG. 15-19.

Orophosoma hingstoni (Carl), ♂ cotype. — 15: prefemur of left gonopod, lateral aspect. — 16: apex of left gonopod, medial aspect. — 17: the same, lateral aspect.

Orophosoma simulans (Carl), ♂ cotype. — 18: right gonopod, medial aspect. 19: apex of same, lateral aspect.

Orophosoma hingstoni (Carl)

Orthomorpha hingstoni Carl, 1935: 326.

Material. — The type-material from Tibet was probably divided between the British Museum, London, and the Geneva museum. In the latter I found a ♀ cotype, and the left gonopod of a ♂ cotype the body of which is probably in London.

Remarks. — Although Carl gave a good description of this species the opportunity is taken here to give some additional information and drawings to clarify certain details.

The pleurae of the body somites have a premarginal furrow along their caudal border. A similar furrow runs across the metatergites along their caudal border from paranotum to paranotum.

The gonopods (Fig. 15-17) have a heavily chitinized process at the lateral side of the prefemur which fits into an excavation of the antero-distal side of the coxa. The solenomerite is more or less parallel-sided over most of its length, but towards its apex it bears a straight, thin additional spine pointing distad, and beyond this spine it tapers rapidly into a flagelliform apex.

Orophosoma simulans (Carl)

Orthomorpha simulans Carl, 1935: 330

Material. — The type-material of this species from Nepal and Tibet was apparently similarly divided between the museums of London and Geneva. In the Geneva museum there are a ♀ cotype and the right gonopod of a ♂ cotype from Nepal.

Remarks. — The structure of the gonopods (Fig. 18-19) is similar to that in the preceding species, and the solenomerite is also almost parallel-side over most of its length. Unfortunately, owing to the delicate structure of apex of the gonopods it was not possible to ascertain either the presence or absence of a separate spine on the solenomerite.

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REFERENCES

- ATTEMS, C. 1914. Die indo-australischen Myriopoden. *Arch. Naturgesch.* 80A (4): 1-398, pl. 1-7.
 — 1931. Die Familie Leptodesmidae und andere Polydesmiden. *Zoologica Suttgart.* 30 (3/4): 1-150.
 — 1936. Diplopoda of India. *Mem. Indian Mus.* 11: 133-323.
 — 1937. Polydesmoidea I, Fam. Strongylosomidae. *Tierreich* 68: i-xxii, 1-300.
 — 1938. Die von Dr. C. Dawydoff in französisch Indochina gesammelten Myriopoden. *Mém. Mus. natn. Hist. nat. Paris*, (n. s.) 6: 187-353.
 — 1953. Myriopoden von Indochina. Expedition von Dr. C. Dawydoff (1938-1939). *Mém. Mus. natn. Hist. nat. Paris*, (n. s., A) 5: 133-230.

- BRÖLEMANN, H. W. 1916. Essai de classification des Polydesmiens. *Annls Soc. ent. Fr.* 84: 523-608.
- CARL, J. 1912. Die Diplopoden-Fauna von Celebes. *Revue suisse Zool.* 20: 73-206, pl. 5-6.
- 1935. Polydesmiden der III. Everest-Expedition, 1924. *Revue suisse Zool.* 42: 325-340.
- CHAMBERLIN, R. V. 1921. New Chilopoda and Diplopoda from the East Indian region. *Ann. Mag. nat. Hist.* (9) 7: 50-87.
- 1923. Two diplopod immigrants taken at Honolulu. *Proc. biol. Soc. Wash.* 36: 165-168.
- 1924. A new milliped of the genus *Orthomorpha*, immigrant from the Philippine Islands. *Ent. News* 35: 173-174.
- 1941. New polydesmoid diplopods intercepted at quarantine. *Proc. ent. Soc. Wash.* 43: 32-35.
- COOK, H. F. and O. F. LOOMIS, 1924a. A new family of spined millipeds from Central China. *J. Wash. Acad. Sci.* 14: 103-108.
- 1924b. A dragon milliped in China. An extreme type, showing that evolution is not limited to useful characters. *J. Hered.* 15: 51-53.
- HOFFMAN, R. L. 1973. Descriptions and allocation of new or poorly known genera and species of Paradoxosomatidae from southeastern Asia (Diplopoda, Polydesmida). *J. nat. Hist.* 7: 361-389.
- JEEKEL, C. A. W. 1953. Two new Strongylosomidae from Indochina (Diplopoda, Polydesmida). *Beaufortia* 2 (29): 1-8.
- 1964. Two new species of *Pratinus* Attems, with taxonomic notes on the genus and a redescription of its type-species (Diplopoda, Polydesmida). *Beaufortia* 11: 61-73.
- 1967. A revision of the Papuan Paradoxosomatidae (Diplopoda, Polydesmida) in the Museo Civico di Storia Naturale at Genoa. *Tijdschr. Ent.* 110: 343-379.
- 1968. On the classification and geographical distribution of the family Paradoxosomatidae (Diplopoda, Polydesmida). *Amsterdam*, privately printed. pp. 1-162.
- LOKSA, I. 1960. Einige neue Diplopoden- und Chilopodenarten aus chinesischen Höhlen. *Acta zool. hung.* 6: 135-148.
- POCOCK, R. I. 1895a. Report upon the Chilopoda and Diplopoda obtained by P. W. Bassett-Smith, Esq., Surgeon R.N., and J. J. Walker, Esq., R.N., during the cruise in the Chinese seas of H.M.S. "Penguin", Commander W.U. Moore commanding. *Ann. Mag. nat. Hist.* (6) 15: 346-372, pl. 11.
- 1895b. The Myriopoda of Burma, Pt. IV. Report upon the Polydesmoidea collected by Sig. L. Fea, Mr. E. W. Oates and others. *Annali Mus. civ. Stor. nat. G. Doria* 34: 787-834.
- SILVESTRI, F. 1898. Alcuni nuovi Diplopodi della N. Guinea. *Annali Mus. civ. Stor. nat. G. Doria* 39: 441-449.
- VERHOEFF, K. W. 1933. Myriapoda gesammelt vom schwedischen Arzt der Expedition Dr. David Hummel 1927-1930. *Ark. Zool.* 26A (10): 1-41, pl. 1-5.
- 1936. Zur Kenntnis ostasiatischer Strongylosomiden und Fontariiden. *Zool. Anz.* 115: 297-311.
- WANG, Y. M. 1958. Serica li: On Diplopoda from Taiwan with a new strongylosomids. *Q. Jl Taiwan Mus.* 11: 340-344.

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